

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D. C. 20554**

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In the Matter of)
)
Redevelopment of Spectrum to)
Encourage Innovation in the)
Use of New Telecommunications)
Technologies)

ET Docket No. 92-9

To: The Commission

Comments of Apple Computer, Inc.

Apple Computer, Inc. ("Apple"), hereby submits comments on the Notice of Proposed Rulemaking ("NPRM") in the above-referenced proceeding. Apple strongly supports the Commission's efforts to select appropriate frequencies for emerging technologies. One such technology – Data-PCS – was the subject of Apple's January 1991 Petition for Rulemaking, which now has been consolidated in the PCS proceeding, Gen. Doc. 90-314 .

Data-PCS and other user-provided services, such as wireless PBXs, the "electronic office" and the multimedia classroom environment, are ready for implementation by a large number of companies in the computer, communications, and related industries, as soon as the FCC allocates frequencies. Apple has joined with many of these companies to create the WINForum, whose goal is the allocation exclusive frequencies for non-licensed User-PCS voice and data technologies.

In addition, the IEEE 802 Local Area Network Standards Committee – a constituent part of the professional organization of engineers from communications and computer companies, scientific and government agencies, educational institutions and public utilities – is working to formulate and refine the etiquettes and protocols that will establish a fair and workable signaling environment for new, non-licensed wireless information technologies. The IEEE

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Committee, too, has urged the Commission to provide exclusive frequencies for Data-PCS and similar user-provided technologies.

The IEEE Committee and the WINForum are filing comments in this proceeding, in which Apple has joined. Apple, therefore, will not repeat the positions stated in those comments, or even discuss again the considerable benefits that would flow from an allocation of frequencies to Data-PCS.¹ Rather, here Apple wishes to stress that, unless the Commission modifies the transition plan proposed in the NPRM, Data-PCS cannot develop in these emerging technology bands for the reasons set out below.

A. Despite The Widespread Agreement Regarding The Value Of Data-PCS, The Proposed Transition Plan Will Preclude Its Development.

The number and quality of companies participating in the IEEE Committee and the WINForum demonstrates concretely that the computer industry and associated industries are poised to offer new technologies that promise to revolutionize the way people work, learn, and interact with each other. Virtually no day goes by without another press announcement or article about increases in productivity and other values created by adding wireless connectivity to the power of the computer.

Moreover, the FCC Chairman and other Commissioners have pointed to wireless data technologies as examples of the emerging technologies that are expected to develop, if only adequate spectrum resources can be found at 2 GHz.² Even PCS proponents with different service objectives, including those seeking licensed spectrum for carrier-provided services, have told the Commission that provision must also be made for the services, such as Data-PCS, that require a non-licensed band of frequencies.³

¹ Apple Petition for Rulemaking, RM 7618 ("Apple Petition"). See, e.g., Apple Petition at 5-7; Statement of Apple Computer, Inc., En Banc Hearing Before the FCC on PCS and Data PCS at 2.

² See, e.g., Letter from Chairman Sikes to Senator Warner (July 1, 1991), Gen. Docket No. 90-314; Statement of Chairman Sikes Before the Subcommittee on Communications, Committee on Science, and Transportation, U.S. Senate, on Allocating Radio Spectrum for New Services Based on Emerging Telecommunications Technologies, (June 3, 1992), at 1, 5, 6.

³ See APC Supplement to Petition for Rulemaking, Statement of NERA Before the FCC En Banc Hearing on PCS at 6-8, Gen. Docket No. 90-314 at n. 15, pp. 20-21.; Comments of NATA, Gen. Docket No. 90-314 at 5, Comments of Northern Telecom., Gen. Docket No. 90-314 at 13. Apple believes that the FCC should foster a wide variety of carrier-provided networks, including

Data-PCS and similar technologies will develop only if there is a new allocation of frequencies devoted exclusively to non-licensed data and voice communications services. As Apple pointed out in its original Petition, there are no existing radio services and no existing frequency bands in which such User-PCS can be provided.⁴ Yet, the Commission has not met the needs of such technologies in its NPRM, because the proposed transition plan would not clear the incumbent microwave users from the band in realistically timely manner.

The proposed transition plan would allow microwave incumbents, who are not state and local licensees, to retain co-primary status in the 2 GHz band for a ten to fifteen year period.⁵ State and local licensees could retain such status indefinitely.⁶ The Commission even has backed away from its original proposal to cut off co-primary status for additional microwave facilities in these bands.⁷ Data-PCS and similar technologies, however, cannot share frequencies with existing microwave users who have co-primary, or even secondary, status on the bands for the following reasons:

- Unlike carrier-provided PCS, in which the service area is fixed by license and user access to frequencies is controlled centrally by the carrier, Data-PCS must be an “anyplace, anytime” technology for people to use no matter where they may find themselves. Thus, the same block of frequencies must be used for Data-PCS nationwide, to make implementation feasible.
- Despite all the studies, claims, and counterclaims that have been presented to the Commission and the Congress, no one has been able to show that there is some means for overlay, frequency agility, or any modulation scheme, including CDMA, or the like, that would allow Data-PCS to be introduced into these bands as they are now used.⁸ It

PCS, to provide vital wide-area connectivity between and among “local area.” LEOs and LANs are just extremes of the connectivities that are needed.

⁴ Apple Petition for Rulemaking, RM 7618.

⁵ NPRM, ¶24.

⁶ *Id.* at ¶25.

⁷ See Public Notice No. 23115, May 14, 1992.

⁸ See Apple's Petition, Reply Comments to RM -7618, and the Comments of IEEE 802 Local Area Network Standards Committee to the NPRM, for more discussion of technical issues regarding sharing of a medium by these services.

would not be possible to assure that Data-PCS would neither cause interference to nor be subjected to interference from microwave links operating in the vicinity.

- The fixed microwave services, moreover, cannot avail themselves of sharing techniques, including data packetization and recontention for access to the transmission medium, that conventionally are used to enable intensive sharing of computer networks.
- Finally, the incumbent fixed microwave users have expressed no interest in “sharing” with non-licensed services, even if it were somehow feasible. In fact they have categorically rejected that possibility even in advance of technical scrutiny and discussion.

Thus, practical implementation of Data-PCS requires that the FCC allocate an adequate block of frequencies, nationwide, reserved exclusively for user-provided services. With a sufficient initial frequency allocation, Apple and other manufacturers can accommodate phased implementation of the new frequencies. No manufacturer, however, can make the necessary investment to develop these new technologies if it will be ten or fifteen years (or an indefinite period) before they can be used: Nor can the U.S. sit quietly by and allow other countries to determine the future of critical new technologies.

B. Data-PCS Users Cannot “Negotiate” To Clear Frequencies Without The Active Involvement Of The FCC.

It is no answer to state that the NPRM’s transition plan would allow parties seeking earlier access to the frequencies to negotiate with the incumbents to accelerate the frequency clearing process. Unless the incumbents know that there is some relatively early date certain by which they must vacate the frequencies, and that they may be reimbursed only to the extent of their reasonable expenses, the incumbents will have no incentive to negotiate. The desire to extract windfall premiums for early departure might prove irresistible if it is not precluded.

Moreover, any negotiation with the incumbents will be difficult for those seeking the creation of a band of cleared frequencies for the benefit of users who will not require licenses. Representatives of the utilities industries have

recognized this difficulty and have rejected out of hand the creation of a non-licensed frequency band. They believe, apparently, that without a licensee with a direct economic interest in maximizing profits from the use of the spectrum there will be no one to pay them to relocate.⁹

To the contrary, Apple has long held that it is possible to implement mechanisms to provide for the reimbursement of the reasonable dislocation expenses of the incumbents.¹⁰ Some of the mechanisms are primarily financial; some technical. Some mechanisms need further development. No such mechanism will succeed, however, or even be considered fairly, without the active involvement of the FCC to assure a prompt and reasonable conclusion to any negotiation with incumbents on behalf of users of non-licensed PCS frequencies.

C. The Reasonable Concerns Of The Incumbents Can Be Addressed, But Unless The Commission's Proposal Is Modified, The Promise Of The New Technologies Will Prove To Be Illusory.

As Apple, WINForum, the IEEE Committee, and others have made clear, there can be no Data-PCS, User-PCS, or like technologies without a sizable band of non-licensed 2 GHz frequencies quickly cleared of microwave incumbents and devoted exclusively to low-power data and voice communications having compatible transmission characteristics.

Apple understands the dilemma that the Commission has in attempting to create needed opportunities for new technologies while not risking damage to existing public services. It would be irresponsible to take any action that, benefitted emerging technologies but actually impaired the availability and reliability of services provided by railroad and public utility spectrum users.

Many of the concerns expressed by the incumbents about reliability and availability of alternate frequency bands, however, have been satisfactorily addressed by the FCC and NTIA, while other of the incumbents' concerns have been embellished with rhetoric that tends to impede constructive dialogue. Once

⁹ See Apple Petition at 23.

¹⁰ See Statement of Apple Computer, Inc., Hearing before House Subcommittee on Telecommunications and Finance, March 12, 1991 at 8.

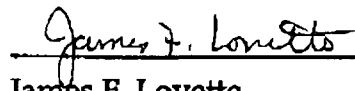
Many of the concerns expressed by the incumbents about reliability and availability of alternate frequency bands, however, have been satisfactorily addressed by the FCC and NTIA, while other of the incumbents' concerns have been embellished with rhetoric that tends to impede constructive dialogue. Once past the rhetoric, there are real technical and cost issues facing the railroads and utilities, which Apple and other companies – with technical expertise, energy, money and good faith – are fully prepared to address and satisfy.

What must remain paramount, however, is that change must come about to provide spectrum for new non-licensed services. Even the companies that are the strongest proponents of the new technologies will not make the investments that are required to bring them to fruition unless the Commission is rigorous in securing the future for them.

The Commission has done much to encourage the proponents of new technologies over the past several years, with its actions in the PCS proceeding and with the NPRM. Now the Commission must keep faith with the innovators it has encouraged, as well as with the public whose expectations have been raised, by allocating an amount of spectrum sufficient to allow implementation of emerging technologies, including Data-PCS, on a timely basis.

Respectfully submitted,

Apple Computer, Inc.



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